



US009108325B2

(12) **United States Patent**  
**Sakon et al.**

(10) **Patent No.:** **US 9,108,325 B2**  
(45) **Date of Patent:** **Aug. 18, 2015**

(54) **ELECTRIC SHAVER**

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(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 876 days.

(21) Appl. No.: **13/009,226**

(22) Filed: **Jan. 19, 2011**

(65) **Prior Publication Data**  
US 2011/0179648 A1 Jul. 28, 2011

(30) **Foreign Application Priority Data**  
Jan. 22, 2010 (JP) ..... 2010-012189

(51) **Int. Cl.**  
**B26B 19/02** (2006.01)  
**B26B 19/38** (2006.01)  
(52) **U.S. Cl.**  
CPC ..... **B26B 19/384** (2013.01)  
(58) **Field of Classification Search**  
CPC ..... B23B 19/384  
USPC ..... 30/346.51, 346.61, 346.55, 346.56, 30/346.57, 43.91, 43.92, 34.2, 43.6, 43.9  
See application file for complete search history.

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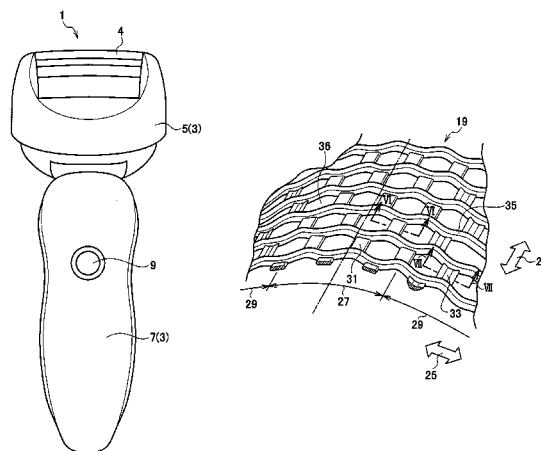
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*Assistant Examiner* — Jennifer Swinney  
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(57) **ABSTRACT**

An electric shaver includes: a main body; an outer blade provided to an end of the main body and having a blade hole defined by a bar; and an inner blade provided inward of the outer blade and configured to reciprocate in a longitudinal direction of the outer blade to cut hair in the blade hole with the outer blade. The bar has a hair raising portion coming in contact with hair upon movement of the outer blade on a skin surface to raise hair up from the skin surface. A contact pressure on the skin surface to be exerted by the outer blade in a first portion of the outer blade is greater than that in a second portion of the outer blade. Hair raising performance in raising hair up from the skin surface in the first portion is smaller than hair raising performance in the second portion.

**9 Claims, 10 Drawing Sheets**



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FIG. 1

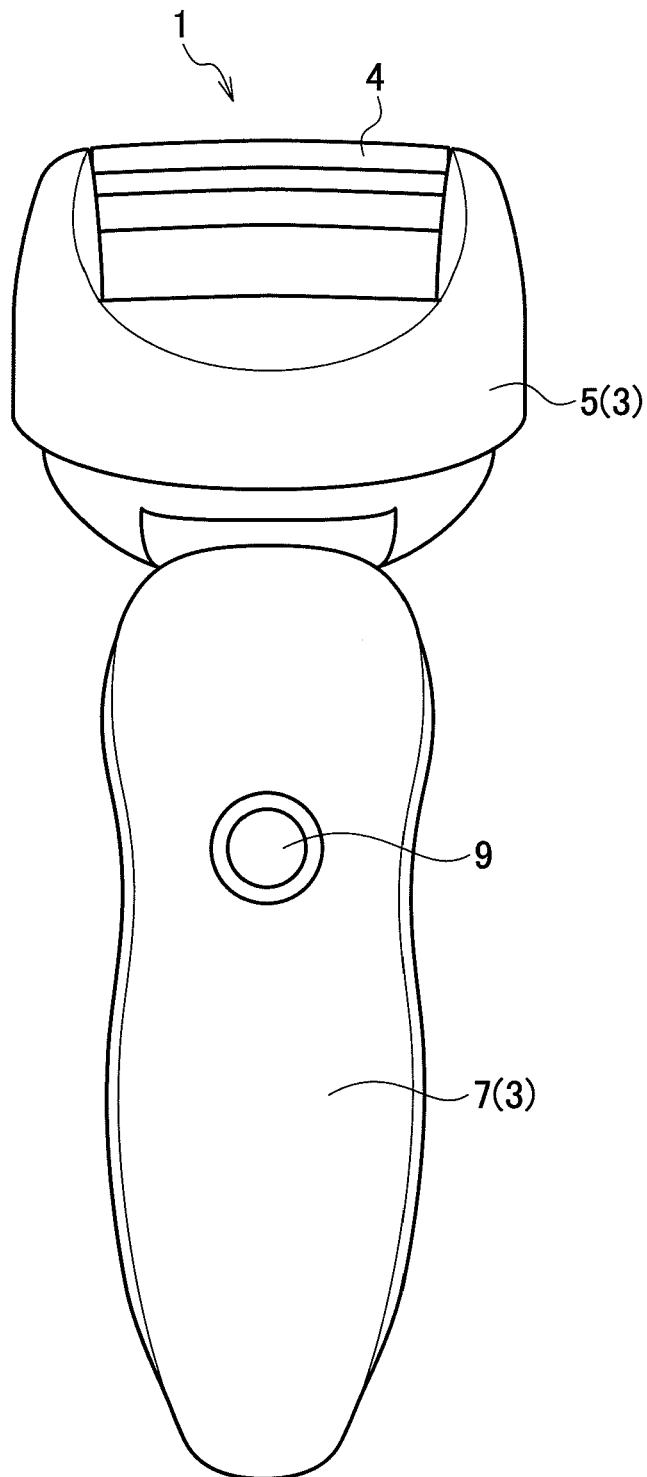


FIG. 2

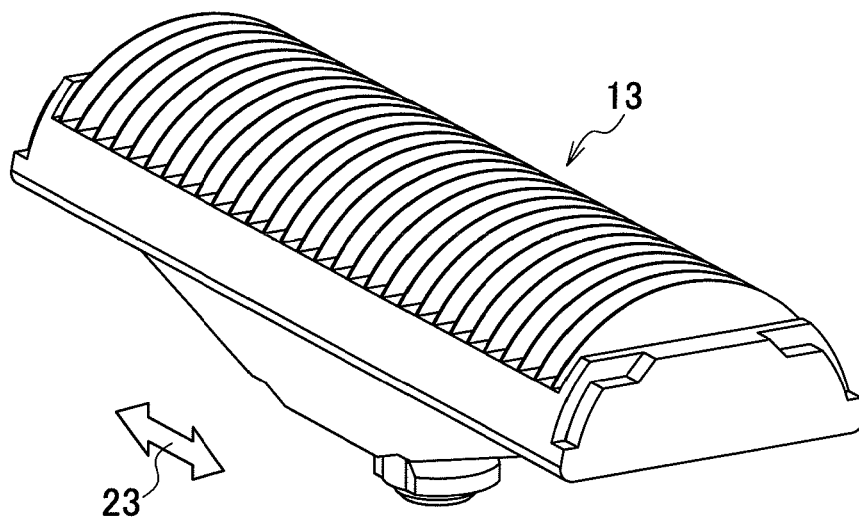


FIG. 3

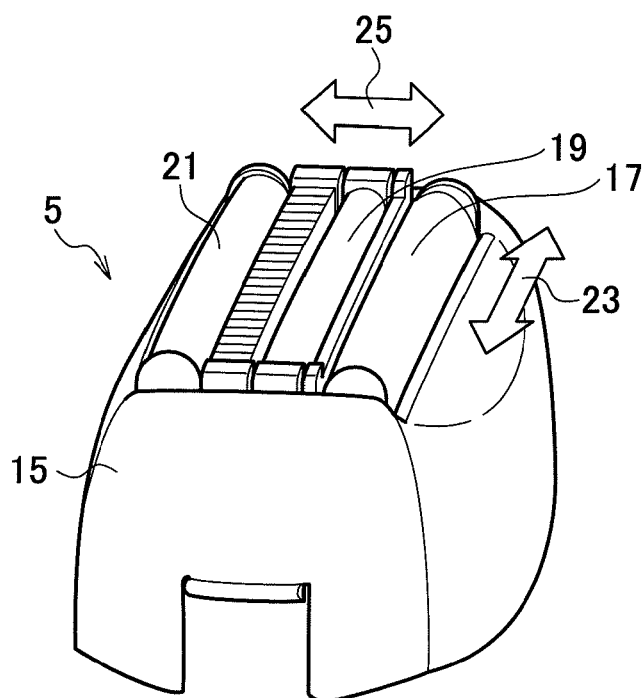


FIG. 4

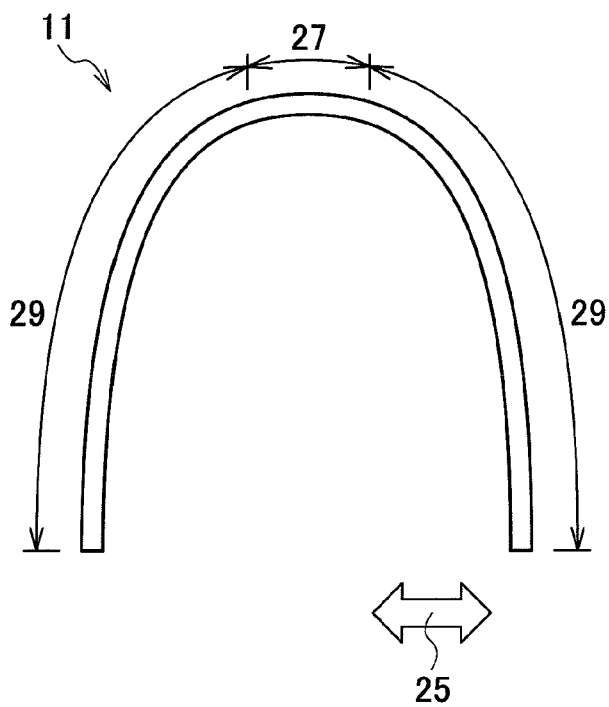


FIG. 5

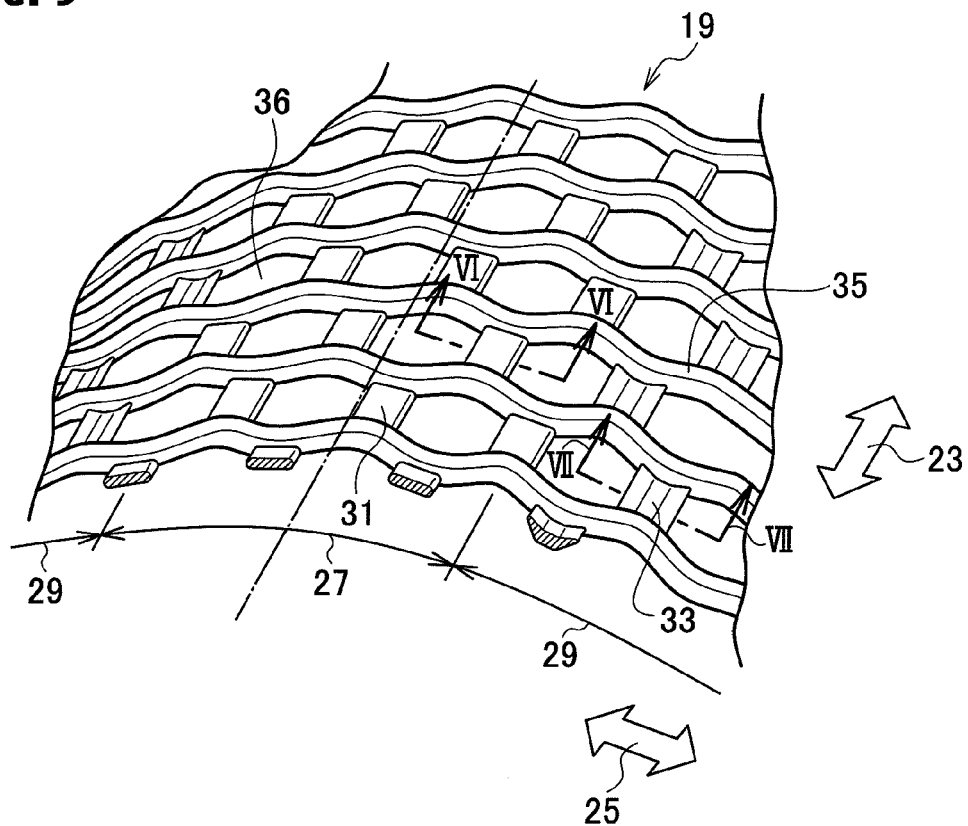


FIG. 6A

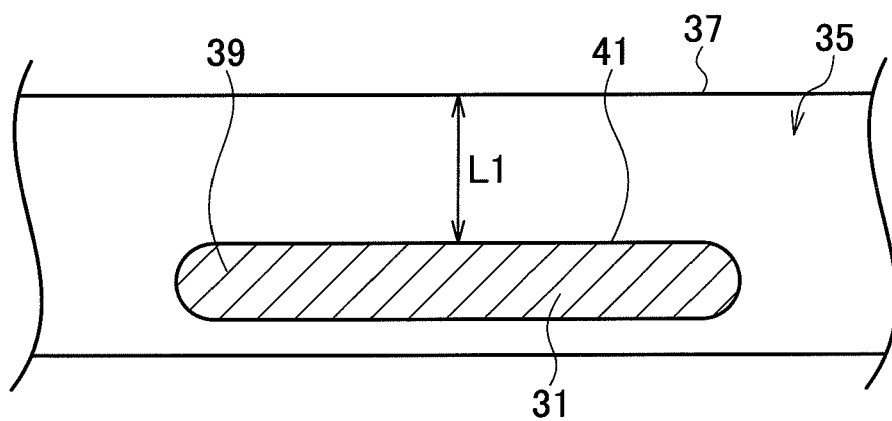


FIG. 6B

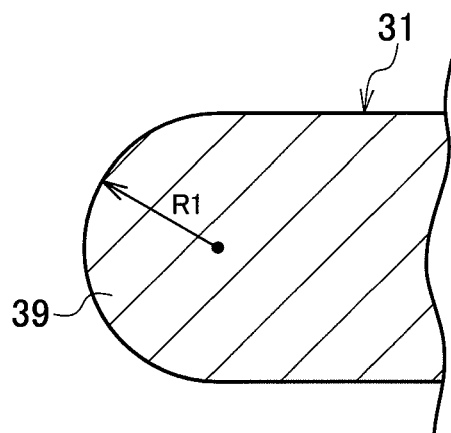


FIG. 7A

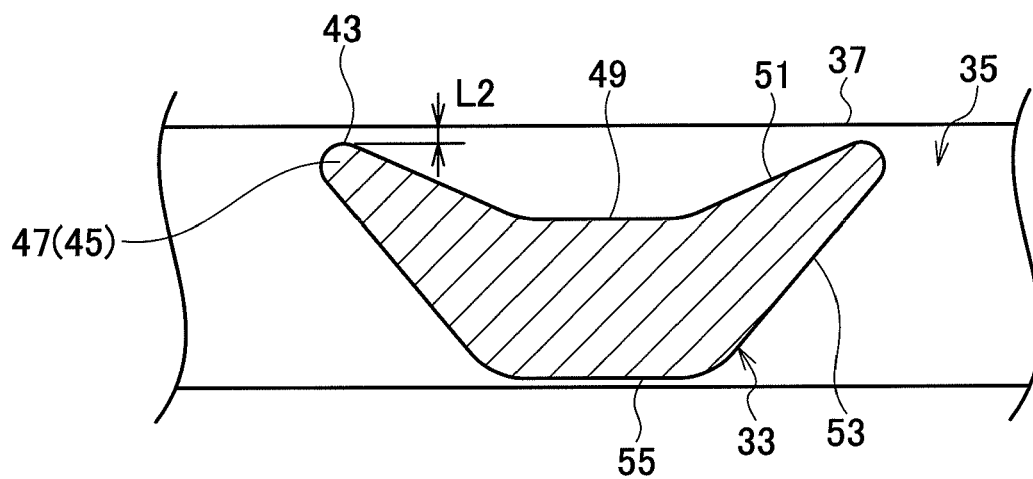


FIG. 7B

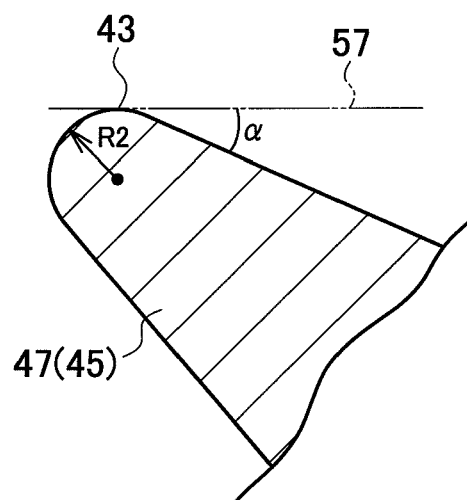


FIG. 8

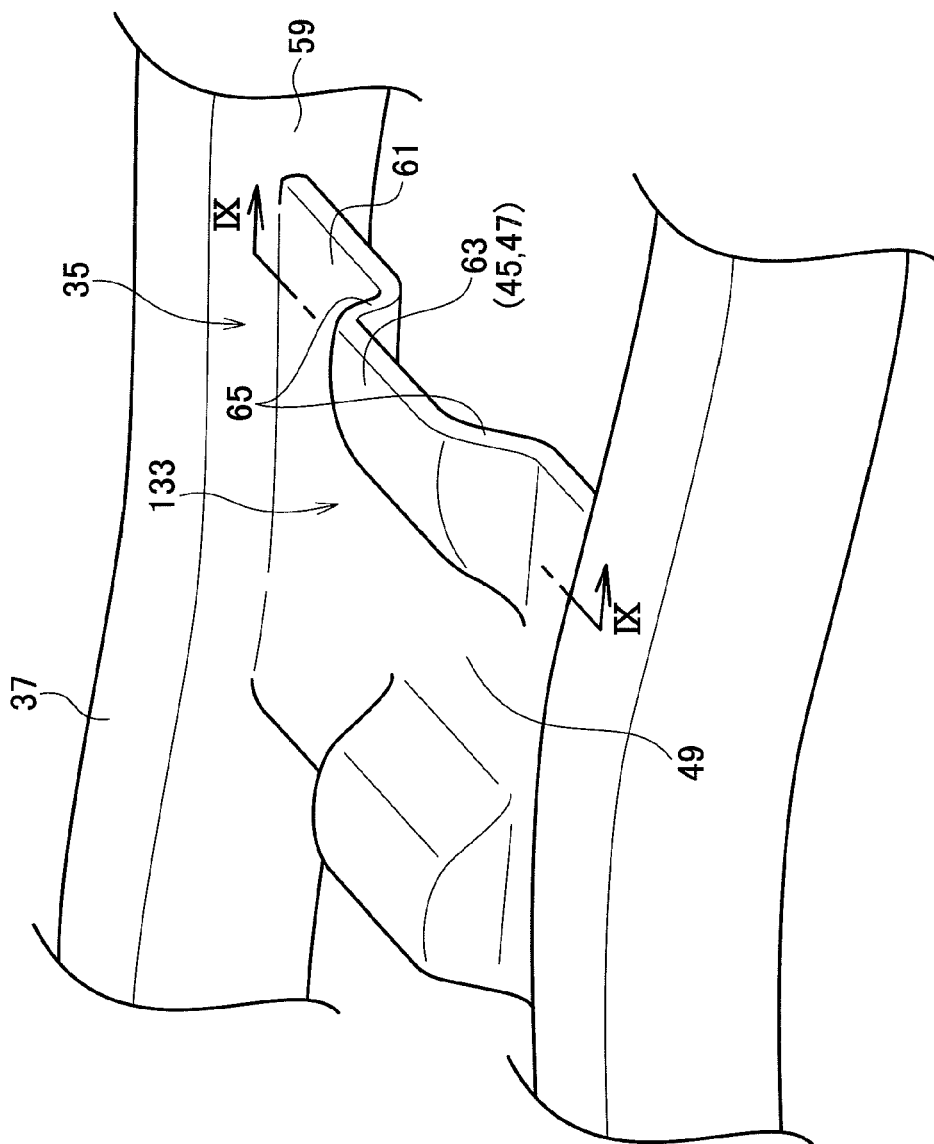




FIG. 9

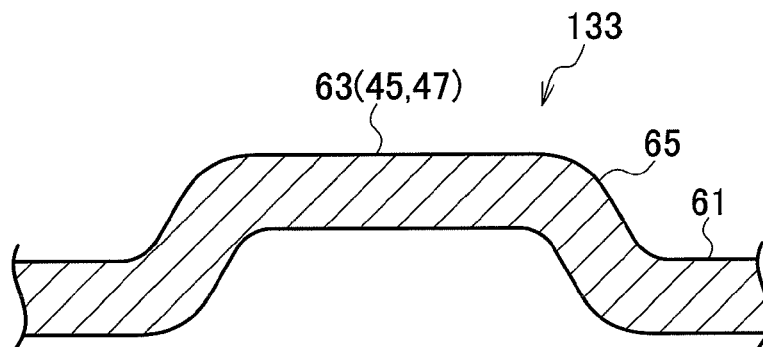


FIG. 10A

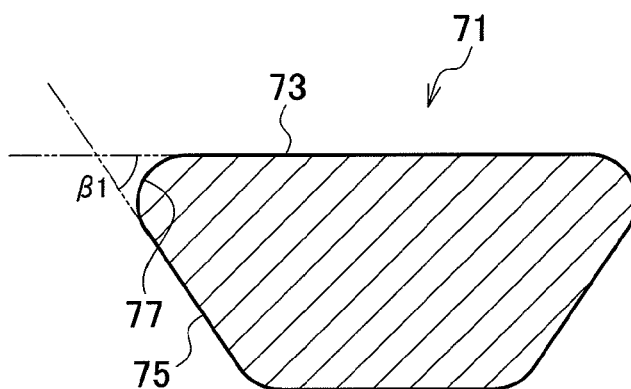


FIG. 10B

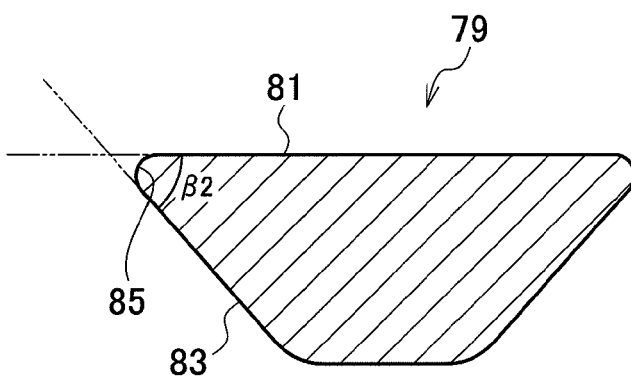


FIG. 11

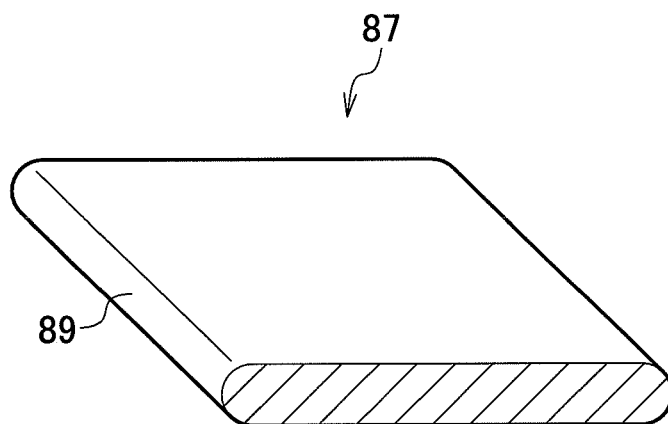


FIG. 12

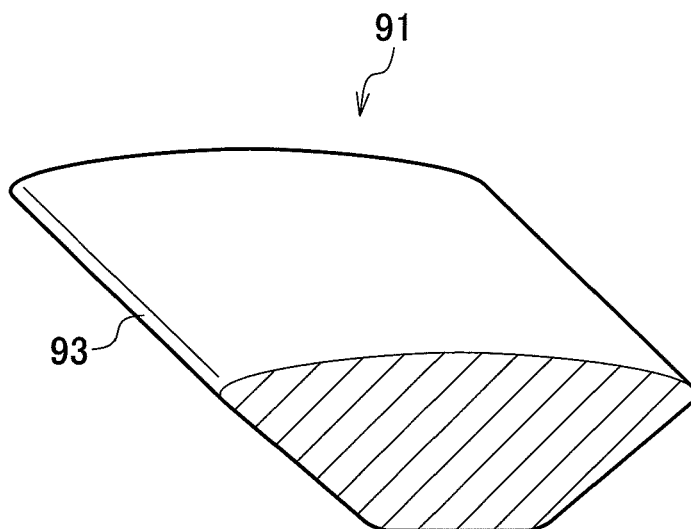


FIG. 13

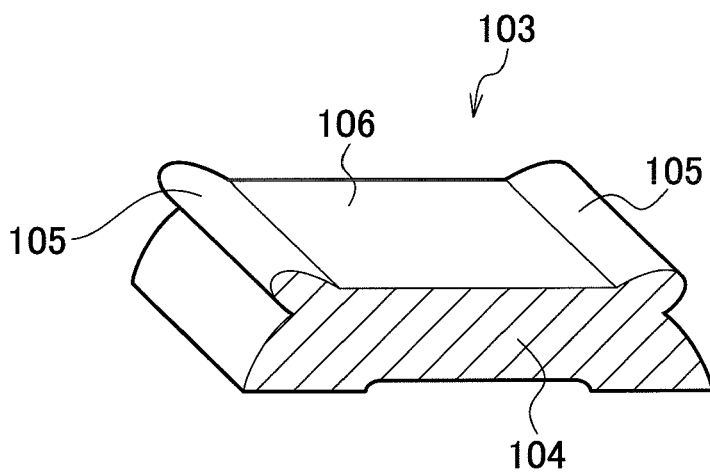


FIG. 14

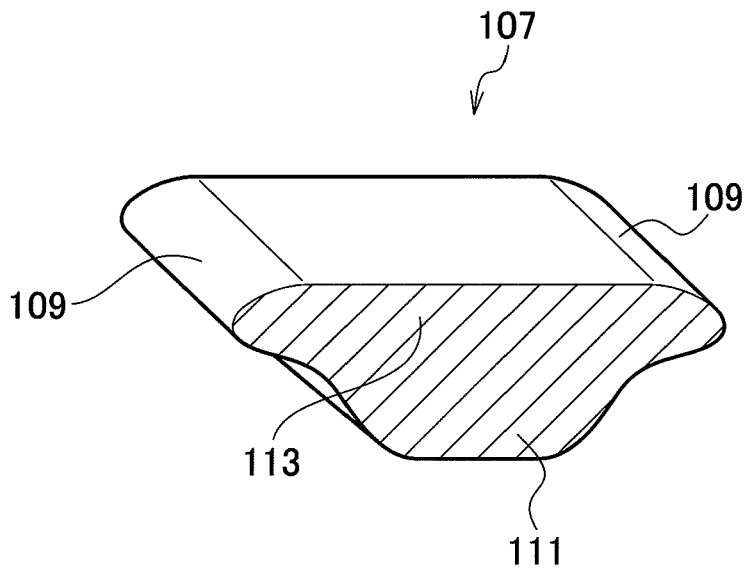


FIG. 15

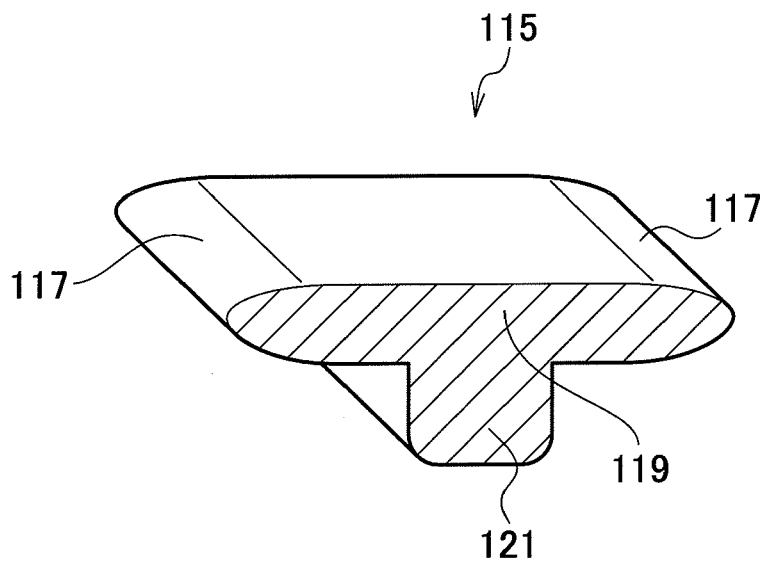
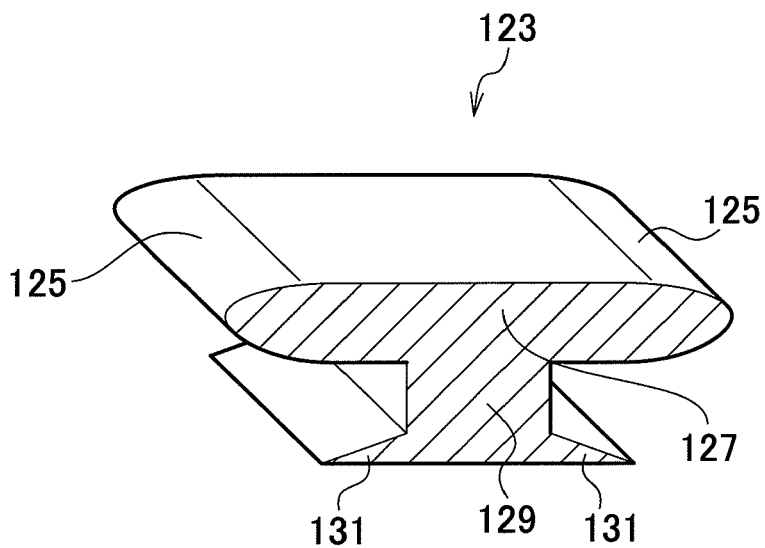


FIG. 16



# 1

## ELECTRIC SHAVER

### CROSS REFERENCE TO RELATED APPLICATION

This application is based upon and claims the benefit of priority from the prior Japanese Patent Application No. 2010-012189, filed on Jan. 22, 2010, the entire contents of which are incorporated herein by reference.

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates to an electric shaver, and specifically to an electric shaver provided with a hair raising portion having a hair raising function to raise body hair that has a small angle with respect to a skin surface.

#### 2. Description of the Related Art

Various types of electric shavers exist for shaving body hair. The angle at which body hair extends with respect to a skin surface is called a hair rising angle. Body hair having a large hair rising angle (e.g., 45° to 60°) is easy to shave. However, a problem arises in a case of body hair having a small hair rising angle (e.g., 30° or smaller) because it is difficult to shave. For such body hair having a small hair rising angle, an electric shaver provided with hair raising portions to raise body hair is described in Japanese Patent No. 3083548.

### SUMMARY OF THE INVENTION

According to Japanese Patent No. 3083548, the hair raising portions having the equivalent hair raising performance are disposed in both of a portion coming into contact with the skin surface with a large contact pressure and a portion coming into contact with the skin surface with a small contact pressure. Thus, there is a possibility that the hair raising portion in the large contact-pressure portion damages the skin surface.

An object of the present invention is to provide an electric shaver capable of efficiently raising body hair while reducing impact on the skin surface.

An aspect of the present invention is an electric shaver comprising: a main body to be gripped by a user; an outer blade provided to an end portion of the main body and having a blade hole defined by a bar; and an inner blade provided inward of the outer blade and configured to reciprocate in a longitudinal direction of the outer blade to cut hair let in the blade hole in cooperation with the outer blade, wherein the bar has a hair raising portion configured to come in contact with hair upon movement of the outer blade on a skin surface to raise hair up from the skin surface, a contact pressure on the skin surface to be exerted by the outer blade in a first portion of the outer blade is greater than a contact pressure in a second portion of the outer blade, and hair raising performance in raising hair up from the skin surface in the first portion is smaller than hair raising performance in the second portion.

According to the above aspect, by setting the hair raising performance lower for the portion exerting a high contact pressure on the skin surface than for the portion exerting a low contact pressure, it is possible to reduce impact (e.g., damage) on the skin surface given by the portion exerting the high contact pressure on the skin surface. On the other hand, impact on the skin surface given by the portion exerting the low contact pressure on the skin surface is naturally small. Accordingly, the improving of the hair raising performance thereof allows such a portion to raise hair efficiently. Also, a

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simple action such as moving the electric shaver's main body on the skin surface can automatically raise body hair having a small hair rising angle.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front view showing an electric shaver according to an embodiment of the present invention.

FIG. 2 is a perspective view showing an inner blade.

FIG. 3 is a perspective view showing an upper housing.

FIG. 4 is a schematic diagram of an outer blade viewed from a lateral side.

FIG. 5 is an enlarged perspective view of a part of the outer blade.

FIG. 6A is a cross-sectional view taken along the VI-VI line of FIG. 5, and FIG. 6B is an enlarged cross-sectional view of a lateral end.

FIG. 7A is a cross-sectional view taken along the VII-VII line of FIG. 5, and FIG. 7B is an enlarged cross-sectional view of a hair raising portion.

FIG. 8 is an enlarged perspective view of a longitudinal bar and its peripheral portions according to another embodiment of the present invention.

FIG. 9 is an enlarged cross-sectional view taken along the IX-IX line of FIG. 8.

FIGS. 10A and 10B show longitudinal bars according to Modification 1. FIGS. 10A and 10B are cross-sectional views in a top portion and a lateral side portion.

FIG. 11 is a cross-sectional view of a longitudinal bar according to Modification 2.

FIG. 12 is a cross-sectional view of a longitudinal bar according to Modification 3.

FIG. 13 is a cross-sectional view of a longitudinal bar according to Modification 4.

FIG. 14 is a cross-sectional view of a longitudinal bar according to Modification 5.

FIG. 15 is a cross-sectional view of a longitudinal bar according to Modification 6.

FIG. 16 is a cross-sectional view of a longitudinal bar according to Modification 7.

### DETAILED DESCRIPTION OF THE EMBODIMENT

Hereinbelow, an embodiment of the present invention will be described in detail by referring to the drawings.

As shown in FIG. 1, an electric shaver 1 according to the embodiment includes: a lower housing 7 which the user grips; an upper housing 5 connected to the lower housing 7; and a main blade 4 provided at the leading end of the upper housing 5. In the lower housing 7, a push-type switch 9 is disposed. The upper housing 5 and the lower housing 7 together constitute a main body 3 of the electric shaver (hereinafter, referred to as "electric-shaver main body 3"). As shown in FIGS. 1 and 2, the main blade 4 is formed of: an outer blade 11 disposed at an outer side; and inner blades 13 disposed inward of the outer blade 11 and configured to reciprocate in a longitudinal direction 23 (see an arrow in FIG. 3).

As shown in FIG. 3, the upper housing 5 is provided with: a housing main body 15; and first, second and third outer blades 17, 19 and 21 disposed at the upper end of the housing main body 15. The outer blade 11 is formed of the first to third outer blades 17, 19 and 21, and extends in the longitudinal direction 23. The first and third outer blades 17 and 21 are disposed at both lateral sides in a lateral direction 25. The second outer blade 19 is disposed between the first and third outer blades 17 and 21.

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The outer blade **11** is formed to curve in a reverse U-shape in the side view. A top portion **27** of the outer blade **11**, which is located highest, exerts a large contact pressure on the skin surface. Meanwhile, outer portions **29**, which are located at both outer lateral sides of the top portion **27**, exert smaller contact pressures on the skin surface than that of the top portion **27**.

The outer blade **19** will be described below in detail.

A dashed line in FIG. **5** is a center line extending along the center, in the lateral direction **25**, of the top portion **27**. As shown in FIG. **5**, lateral bars **35** extend in the lateral direction **25**, and longitudinal bars **31** and **33** extend in the longitudinal direction **23**. These bars **35**, **31** and **33** define blade holes **36** each in a substantially hexagonal shape in the plan view. The blade holes **36** are formed into such sizes that body hair can be let therein. The longitudinal bars **31** each have cross-sectional shapes shown in FIGS. **6A** and **6B** and are disposed to the top portion **27**. The longitudinal bars **33** each have cross-sectional shapes shown in FIGS. **7A** and **7B** and are disposed to the outer portions **29**.

As shown in FIGS. **6A** and **6B**, each longitudinal bar **31** is formed into a substantially flat-plate shape in cross section, and each lateral end **39** of the longitudinal bar **31** is formed into a semi-circular shape with a curvature radius of  $R1$  in cross section. The curvature radius  $R1$  may be  $10\text{ }\mu\text{m}$ , for example. A top surface **41** of the longitudinal bar **31** is situated closer to the electric-shaver main body than is a top surface **37** of the lateral bar **35**. The vertical distance between the top surface **41** of the longitudinal bar **31** and the top surface **37** of the lateral bar **35** is set to  $L1$ .

On the other hand, each longitudinal bar **33** is formed into a substantially U-shape in cross section, as shown in FIG. **7A**. Specifically, the longitudinal bar **33** has a lateral center portion **49** formed into a flat shape, and bent portions **47** bent upward at and extending laterally from the lateral center portion **49**. The lateral end of each bent portion **47** is a hair raising portion **45** having a tapered shape. The hair raising portion **45** has a function to raise body hair having a small angle with respect to the skin surface. A top surface of the bent portion **47** is an inclined top surface **51**, and a bottom surface thereof is an inclined bottom surface **53**. A surface at the bottom side of the longitudinal bar **33**, i.e., a surface at the opposite side from the lateral center portion **49**, is a bottom surface **55**. In sum, the longitudinal bar **33** is formed by the lateral center portion **49**, the inclined top surfaces **51**, the inclined bottom surfaces **53** and the bottom surface **55**. The vertical distance between each lateral end **43** of the bent portion **47** and the top surface **37** of the lateral bar **35** is set to  $L2$ . Thus, the longitudinal bar **33** is so disposed as to be offset from the lateral bar **35** while satisfying a magnitude relation of  $L2 < L1$ . The difference between  $L1$  and  $L2$  may be  $10\text{ }\mu\text{m}$ , for example. As shown in FIG. **7B**, the lateral end **43** of the bent portion **47** is formed into a semi-circular shape with a curvature radius of  $R2$  in cross section. The magnitude relation between  $R1$  and  $R2$  is set to be  $R2 < R1$ .  $R2$  may be  $3\text{ }\mu\text{m}$ , for example. A clearance angle  $\alpha$  between the inclined top surface **51** and a lateral reference line **57** indicated by a chain double dashed line is set larger than the clearance angle between the top surface **41** of the longitudinal bar **31** shown in FIG. **6A** and the lateral reference line **57** ( $0^\circ$ ). In other words, as to the longitudinal bars **31** and **33** according to the embodiment, no clearance angle (i.e.,  $0^\circ$ ) is given to the longitudinal bar **31** disposed in the top portion **27**, whereas a certain clearance angle is given to the longitudinal bar **33** disposed in the outer portion **29**.

FIG. **8** is an enlarged perspective view of a longitudinal bar and its peripheral portion according to another embodi-

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ment of the present invention. FIG. **9** is an enlarged cross-sectional view taken along the IX-IX line of FIG. **8**.

As shown in FIGS. **8** and **9**, each of longitudinal end portions **61** of the longitudinal bar **133** according to the another embodiment of the present invention extends in the longitudinal direction from the sidewall **59** of the corresponding lateral bar **35** substantially linearly in cross section. The longitudinal end portion **61** is connected to a longitudinal center portion **63** via a gently-curving boundary portion **65**. The curvature radius of the boundary portion **65** may be  $10\text{ }\mu\text{m}$ , for example. In the longitudinal bar **33** shown in FIG. **5**, the hair raising portions **45** (see FIGS. **7A** and **7B**) are continuously extended across the longitudinal direction **23** of the longitudinal bar **33**. In the longitudinal bar **133** shown in FIGS. **8** and **9**, the hair raising portions **45** (the bent portions **47**) are not extended from the sidewall **59** of the corresponding lateral bar **35** but are formed only at the longitudinal center (in a middle portion) of the longitudinal bar **133**.

As modifications, bars in various different shapes can be applied to the longitudinal bars, besides the longitudinal bars **31**, **33**, and **133** described above. First, longitudinal bars **71** and **79** according to Modification 1 will be described.

As shown in FIG. **10A**, in the longitudinal bar **71** disposed in the top portion **27**, a top surface **73** is formed flatly, and hair raising portions **77** are formed at both lateral ends thereof. The opening angle of a tapered portion formed by the top surface **73** and an inclined surface **75** is set to  $\beta1$ . Meanwhile, as shown in FIG. **10B**, in the longitudinal bar **79** disposed in the outer portion **29**, a top surface **81** is formed flatly, and hair raising portions **85** are formed at both lateral ends thereof. The opening angle of a tapered portion formed by the top surface **81** and an inclined surface **83** is set to  $\beta2$ . Here, the magnitude relation between  $\beta1$  and  $\beta2$  is set to be  $\beta2 < \beta1$ , where  $\beta1$  may be  $70^\circ$  and  $\beta2$  may be  $20^\circ$ , for example.

A longitudinal bar **87** according to Modification 2 shown in FIG. **11** is formed into a flat-plate shape, and both lateral ends thereof are set as semi-circular hair raising portions **89**. Even with such a flat-plate shape, the longitudinal bar **87** can be employed as the longitudinal bar in the top portion and in the outer portion as long as the top portion is different from the outer portion in terms of the vertical distance to the top surface **37** of the lateral bar **35**, for example.

A longitudinal bar **91** according to Modification 3 shown in FIG. **12** differs from the aforementioned longitudinal bars **71** and **79** according to Modification 1 in FIG. **10** in that its top surface is curving upward. Both lateral ends are set as semi-circular hair raising portions **93**.

A longitudinal bar **103** according to Modification 4 shown in FIG. **13** is provided with paired hair raising portions **105** and **105** at both lateral ends of a top surface **106** of a main body portion **104**. The top surface **106** is formed as a flat surface.

A longitudinal bar **107** according to Modification 5 shown in FIG. **14** is provided with paired hair raising portions **109** and **109** at both lateral ends of a main body portion **113**. A projecting portion **111** extending downward is formed at a bottom end portion of the longitudinal bar **107**.

A longitudinal bar **115** according to Modification 6 shown in FIG. **15** is provided with paired hair raising portions **117** and **117** at both lateral ends of a main body portion **119**. A projecting portion **121** extending downward is formed at a bottom end portion of the longitudinal bar **115**. In this manner, the longitudinal bar **115** is formed into a substantially T-shape in cross section.

A longitudinal bar **123** according to Modification 7 shown in FIG. **16** is provided with paired hair raising portions **125** and **125** at both lateral ends of a main body portion **127**. A

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projecting portion **129** extending downward is formed at a bottom end portion of the longitudinal bar **123**. Moreover, extending portions **131** and **131** each having a triangular shape and respectively extending laterally are formed at bottom end portions of the projecting portion **129**. In this manner, the longitudinal bar **123** is formed into a substantially H-shape in cross section.

Operations and effects of the embodiment will be described below.

- (1) The electric shaver **1** according to the embodiment includes: the electric-shaver main body **3** which the user grips; the outer blade **11** provided at an end portion of the electric-shaver main body **3**; and the inner blades **13** provided inward of the outer blade **11** and configured to reciprocate in the longitudinal direction of the outer blade **11**. The outer blade **11** has the blade holes **36** defined by the bars. Body hair is let in the blade holes **36** and cut between the outer blade **11** and the inner blades **13**. The bars of the outer blade **11** are provided with the hair raising portions **45**, **77**, **85**, **89**, **93**, **105**, **109**, **117** or **125** that come into contact with body hair when the outer blade **11** is moved on the skin surface and raise the body hair from the skin surface. Among several portions of the outer blade **11**, the hair raising performance in raising body hair, is set smaller for a portion where the outer blade **11** exerts a high contact pressure (e.g., the top portion), than the other portions exerting low contact pressures (e.g., the outer portions).

By setting the hair raising performance lower for the portion exerting a high contact pressure on the skin surface than for the portions exerting low contact pressures as described above, it is possible to reduce impact (e.g., damage) on the skin surface given by the portion exerting the high contact pressure on the skin surface.

Impact on the skin surface given by the portions exerting the low contact pressures on the skin surface is naturally small. Accordingly, the improving of the hair raising performance thereof allows such portions to raise hair efficiently.

- (2) The electric shaver **1** according to the embodiment includes the bars formed of: the longitudinal bars **31**, **33**, **71**, **79**, **87**, **91**, **103**, **107**, **115** or **123** extending in the longitudinal direction of the outer blade **11** and provided with the hair raising portions; and the lateral bars **35** extending in the lateral direction intersecting with the longitudinal direction. This forms the outer blade **11** into a net-like pattern and makes it easier for body hair to be let in the blade holes **19**. Accordingly, body hair can be shaved easily.
- (3) The outer blade **11** is formed to curve in a reverse U-shape in the side view. The top portion **27** of the outer blade **11** exerts a high contact pressure on the skin surface. Meanwhile, the outer portions **29**, which are located at the outer lateral sides of the top portion **27**, exert low contact pressures on the skin surface. The hair raising portions are formed at both lateral ends of the longitudinal bars of the outer blade **11**.

Such a configuration makes it possible to raise body hair through the moving of the electric-shaver main body **3** toward either side in the lateral direction. Thus, the usability of the electric shaver **1** can be improved for its user.

- (4) Both lateral ends of the longitudinal bars **31** and **33** of the outer blade **11** are formed as the tapered hair raising portions **45**. The curvature radius **R1** of each of the lateral ends of the longitudinal bars **31** in the portion where the outer blade **11** exerts a high contact pressure on the skin surface is set larger than the curvature radius

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**R2** of each of the lateral ends of the longitudinal bars **33** in the other portions where the outer blade **11** exerts low contact pressures.

In such a configuration, each hair raising portion **45** is made by shaping the lateral end to taper in cross section. Thus, the hair raising portion **45** can be formed in a simple shape. In addition, the curvature radius **R1** of the lateral end in the portion exerting the high contact pressure on the skin surface is set larger than the curvature radius **R2** of the lateral end in the portions exerting the low contact pressures. Accordingly, it is possible to more securely reduce impact (e.g., damage) on the skin surface given by the portion exerting the high contact pressure on the skin surface.

- (5) The top surfaces of the longitudinal bars **31** and **33** are situated closer to the electric-shaver main body **3** (i.e., situated farther from the skin surface) than are the top surfaces of the lateral bars **35**. Thus, the longitudinal bars **31** and **33** are so disposed as to be offset from the lateral bars **35**. In addition, the distance **L1** between the top surface of each lateral end **39** of the longitudinal bar **31** and the top surface **37** of the lateral bar **35** in the portion where the outer blade **11** exerts a high contact pressure on the skin surface is set larger than the distance **L2** between the top surface of each lateral end **43** of the longitudinal bar **33** and the top surface **37** of the lateral bar **35** in the portion where the outer blade **11** exerts a low contact pressure on the skin surface.

Such a configuration makes it possible to reduce impact (e.g., damage) on the skin surface given by the longitudinal bar **31** in the portion where the outer blade **11** exerts the high contact pressure on the skin surface.

- (6) The opening angle  $\beta 1$  of the tapered portion at each lateral end of the longitudinal bar **71** in the portion where the outer blade **11** exerts a high contact pressure on the skin surface is set larger than the opening angle  $\beta 2$  of the tapered portion at each lateral end of the longitudinal bar **79** in the portions exerting low contact pressures on the skin surface. Accordingly, it is possible to reduce impact (e.g., damage) on the skin surface given by the portion exerting the high contact pressure on the skin surface.
- (7) As the hair raising portions **45**, the bent portions **47** are provided which are the lateral ends, of each longitudinal bar **33**, situated farther from the electric-shaver main body **3** than is the lateral center portion **49** of the longitudinal bar **33**. Thus, the longitudinal bar **33** as a whole is formed into a substantially U-shape in cross section. In addition, the clearance angle  $\alpha$  is formed between the top surface of each bent portion **47** and the lateral reference line **57**. Further, the clearance angle in the portion where the outer blade **11** exerts a high contact pressure on the skin surface ( $0^\circ$ ) is set smaller than the clearance angle  $\alpha$  in the portions where the outer blade **11** exerts low contact pressures on the skin surface.

Such a configuration makes it possible to reduce impact (e.g., damage) on the skin surface given by the portion exerting the high contact pressure on the skin surface. The clearance angle in the portions exerting the low contact pressures may be  $20^\circ$  while the clearance angle in the portion exerting the high contact pressure may be  $5^\circ$ , for example.

- (8) Each of the longitudinal end portions **61** of the longitudinal bar **33** is formed into a substantially linear shape in cross section. In addition, the bent portion **47** is provided to the longitudinal center portion **63**. Moreover, the longitudinal end portions **61** are connected to the longitudinal center portion **63** via the gently-curving boundary portions **65**.

By connecting the longitudinal end portions **61** to the longitudinal center portion **63** via the gently-curving boundary portions **65** in the longitudinal bar **33** in this manner, it is possible to reduce impact (e.g., damage) on the skin surface given by the boundary portions **65** when the outer blade **11** is moved on and along the skin surface.

(9) No clearance angle is given to the lateral ends **39** of the longitudinal bar **31** in the portion where the outer blade **11** exerts a high contact pressure on the skin surface. Meanwhile, the clearance angle  $\alpha$  is given to lateral ends **43** of the longitudinal bar **33** in the portions exerting low contact pressures. Accordingly, it is possible to more securely reduce impact (e.g., damage) on the skin surface given by the longitudinal bar **31** in the portion exerting the high contact pressure on the skin surface.

The present invention is not limited to the above embodiment, and various modifications can be made on the basis of the gist of the present invention.

For example, the leading end portions of the longitudinal bars **31** and **33** are formed into arc shapes with predetermined curvature radii so as to serve as edges causing no irritation of the skin surface; however, the leading end portions may be in polygonal shapes. Moreover, each of the polygonal shapes may be designed to have obtuse angles.

Further, in the above embodiment, a level difference is provided between the top surface of the lateral bar **35** and the top surface of the longitudinal bar **31**; however, the present invention is not limited to such a configuration, and the top surfaces of the lateral and longitudinal bars **35** and **31** may be at the same height.

What is claimed is:

1. An electric shaver comprising:

a main body to be gripped by a user;

an outer blade provided to an end portion of the main body, the outer blade comprising longitudinal bars extending in a longitudinal direction of the outer blade and lateral bars extending in a lateral direction intersecting with the longitudinal direction, wherein the longitudinal bars and the lateral bars intersect to define blade holes; and an inner blade provided inward of the outer blade and configured to reciprocate in a longitudinal direction of the outer blade to cut hair let in the blade holes in cooperation with the outer blade, wherein

the longitudinal bars are located in first and second portions of the outer blade and have hair raising portions configured to come in contact with hair upon movement of the outer blade on a skin surface to raise hair up from the skin surface,

the outer blade has a curved shape in a side view, the first portion is a top portion of the curved shape, the second portion is an outer portion situated at either outer side, in the lateral direction, of the top portion of the curved shape,

a contact pressure on the skin surface to be exerted by the outer blade in the first portion is greater than a contact pressure in the second portion,

a cross-section of the longitudinal bars in the first portion have a different shape than a cross-section of at least one of the longitudinal bars in the second portion,

hair raising performance in raising hair up from the skin surface by the longitudinal bars in the first portion is

smaller than hair raising performance by the longitudinal bars in the second portion,

the hair raising portions are formed into a tapered shape at an end, in the lateral direction, of the longitudinal bars, and

a curvature radius of the end, in the lateral direction, of the longitudinal bars in the first portion is larger than a curvature radius of the end, in the lateral direction, of the longitudinal bars in the second portion.

2. The electric shaver according to claim 1, wherein the curved shape is a reverse U-shape in the side view, and the hair raising portions include first and second hair raising portions formed at both ends, in the lateral direction, of the longitudinal bars.

3. The electric shaver according to claim 1, wherein each of the longitudinal bars have a top surface offset from a corresponding top surface of the lateral bars toward the main body,

a distance between the corresponding top surface of the lateral bars and a corresponding top surface of an end, in the lateral direction, of the longitudinal bars in the first portion is larger than a distance between the corresponding top surface of the lateral bars and a corresponding top surface of an end, in the lateral direction, of the longitudinal bars in the second portion.

4. The electric shaver according to claim 1, wherein the hair raising portions have a bent portion formed by causing an end, in the lateral direction, of the longitudinal bars in the second portion to be spaced away from the main body farther than is a center portion, in the lateral direction, of the longitudinal bars in the second portion, the longitudinal bars in the second portion as a whole has a U-shape cross section,

a top surface of the bent portion forms a clearance angle with respect to the lateral direction, and

a first clearance angle in the first portion is smaller than a second clearance angle in the second portion.

5. The electric shaver according to claim 4, wherein the longitudinal bars in the second portion have:

a longitudinal end portion having a linear shape in cross section;

a longitudinal center portion where the bent portion is formed; and

a boundary portion gently curved to connect the longitudinal end portion to the longitudinal center portion.

6. The electric shaver according to claim 4, wherein the first clearance angle is  $0^\circ$ .

7. The electric shaver according to claim 1, wherein an opening angle of the tapered end, in the lateral direction, of the longitudinal bars in the first portion is larger than an opening angle of the tapered end, in the lateral direction, of the longitudinal bars in the second portion.

8. The electric shaver according to claim 1, wherein the longitudinal bars are provided in adjacent rows that extend in the lateral direction, and wherein the longitudinal bars in one of the adjacent rows are offset in a lateral direction from the longitudinal bars in another of the adjacent rows.

9. The electric shaver according to claim 1, wherein the lateral bars have undulations extending in the lateral direction.